

## A Pilot Study on the Feasibility and Acceptability of a Text Message-Based Aftercare Treatment Programme Among Alcohol Outpatients

Severin Haug<sup>1,\*</sup>, Michael J. Lucht<sup>2</sup>, Ulrich John<sup>3,4</sup>, Christian Meyer<sup>3,4</sup> and Michael P. Schaub<sup>1</sup>

<sup>1</sup>Swiss Research Institute for Public Health and Addiction at Zurich University, Zurich, Switzerland, <sup>2</sup>Department of Psychiatry and Psychotherapy, University of Greifswald at HELIOS Hanseklinikum Stralsund, Stralsund, Germany, <sup>3</sup>Department of Social Medicine and Prevention, University Medicine Greifswald, Greifswald, Germany and <sup>4</sup>DZHK (German Centre for Cardiovascular Research), partner site Greifswald, Greifswald, Germany

\*Corresponding author: Swiss Research Institute for Public Health and Addiction, Konradstrasse 32, CH- 8031 Zurich, Switzerland.  
Tel.: +41-44-448-11-74; Fax: +41-44-448-11-70; E-mail: severin.haug@isgf.uzh.ch

(Received 1 July 2014; first review notified 31 October 2014; in revised form 1 December 2014; accepted 26 December 2014)

**Abstract — Aims:** To test the feasibility, acceptability and initial effectiveness of a text message-based aftercare treatment programme among alcohol outpatients. **Methods:** Clients treated for alcohol use disorders from three Swiss outpatient alcohol treatment centres were invited by their counsellors to participate in a study testing an interactive aftercare programme employing the use of text messages and personal phone calls. Fifty study participants were randomly assigned to either the 6-month aftercare programme ( $n = 25$ ) or treatment as usual ( $n = 25$ ). The intervention consisted of (a) monitoring of self-selected drinking goals at regular intervals, (b) motivational text messages to stick to self-selected drinking goals and (c) proactive telephone calls from counsellors when participants neglected to stick to their drinking goals or expressed a need for support. Follow-up interviews were conducted 6 months after randomization. **Results:** Throughout the programme, participants received a total of 421 text message prompts. Out of these, participants provided valid replies to 371 (88.1%) within 48 h. Out of the 25 participants in the intervention group, 11 (44.0%) sent at least one call-for-help reply. Based on complete case data, at risk alcohol use at follow-up was 41.7% in the control group and 28.6% in the intervention group (OR = 0.56, 95% CI = 0.16–1.95,  $P = 0.36$ ). **Conclusions:** The interactive low-intensive aftercare programme was well accepted by the participants. Testing its efficacy within an adequately powered randomized controlled trial might be reasonable.

### INTRODUCTION

Relapse is common after end of alcohol treatment (Kiefer *et al.*, 2003; Mueller *et al.*, 2007). A German study on the efficacy of outpatient treatment for alcohol use disorders found that 21% of participants relapsed within the first 6 months following treatment, and 46% of participants relapsed within 36 months after end of treatment (Bottlender and Soyka, 2005a,b). Aftercare or maintaining therapeutic contact following the initial intensive treatment phase may improve long-term outcomes (McKay, 2005).

To date, only a few studies have investigated the effectiveness of aftercare programmes following alcohol treatment. A German study found that individuals that regularly attended self-help groups following detoxification did not differ in relapse rates compared with individuals that did not attend self-help groups (Mueller *et al.*, 2007). Another German study investigated the effectiveness of the Outpatient Long-term Intensive Therapy for Alcoholics (OLITA). This programme provides individuals with the contact information of therapists, weekly group therapy sessions and the supervised intake of alcohol deterrents for 2 years following inpatient detoxification (Ehrenreich *et al.*, 1997). At a 7-year follow-up assessment, 52% of patients had not relapsed, and 26% of the patients were completely abstinent from alcohol use (Krampe *et al.*, 2006). Although similar aftercare treatments have shown promise, their implementation into routine care has been questioned due to its intensity and cost. Along these lines, 57% of the patients who met the eligibility requirements for OLITA either showed no interest in participating in aftercare treatment of any kind or decided against programme participation.

Data from the Information Network on Addiction Care and Therapy in Switzerland (act-info) also showed that 38% of patients receiving inpatient treatment for alcoholism and 88% of patients receiving outpatient alcoholism treatment do not

intend to use aftercare (Astudillo *et al.*, 2013). Act-info also revealed that drinking goals vary substantially depending on the treatment setting: while 85% of the inpatients mentioned lifelong or temporary abstinence as their drinking goal and 8% intended to practice controlled drinking, only 50% of the outpatients aimed at lifelong or temporary drinking abstinence, and a larger proportion (35%) intended to practice controlled drinking. Compared with other countries, controlled drinking programmes are relatively widespread in Switzerland (Klingemann and Rosenberg, 2009).

Internet and telecommunications provide novel avenues for aftercare options by extending the reach of inpatient or outpatient health services. For example, Smartphone applications offer continued care through monitoring, information, communication and support services for alcohol-dependent patients following residential treatment. Individuals that have utilized these applications report significantly fewer drinking days than patients receiving treatment as usual (Gustafson *et al.*, 2014). In particular, text messaging is a simple, cost-effective tool that can be employed to continuously monitor patients, as well as provide individualized feedback and reminders to reduce risky health behaviours (e.g. tobacco smoking (Whittaker *et al.*, 2012)) and promote healthy behaviours (Head *et al.*, 2013). In addition, text messages can be used to aid in relapse prevention (e.g. after treatment of eating disorders (Bauer *et al.*, 2012)).

Text messaging is available on all mobile phone platforms and with all providers. Paralleling the increase in mobile phone users, text messaging has also increased within the last few years. A recent review revealed that text message-based intervention programmes have positive effects on adolescent and young adult alcohol use (Mason *et al.*, 2015).

In a pilot study, Lucht *et al.* (2014) investigated a text message-based aftercare approach for alcohol-dependent patients. For a period of 8 weeks, participants received two text messages per week asking if they needed any help. If

participants indicated they did indeed need help, they would receive a phone call from their therapist. This aftercare approach was successfully implemented and patient adherence was satisfactory, such that 52% of participants replied to at least 50% of the prompts. At the end of the aftercare period, 56% of the patients in the text-messaging group achieved low-risk alcohol consumption, while only 40% of the patients of a block-assigned control group did so. This difference, however, was not statistically significant.

The aim of the present pilot study was to investigate the feasibility, acceptability and initial effectiveness of a text messaging based aftercare approach among alcohol outpatients using a randomized controlled design.

## METHODS

### Study design

Participants were randomly assigned to either an intervention group or an assessment only control group. Participants were assigned to the intervention or treatment group using a 1:1 allocation as per a computer-generated randomization schedule. This schedule used permuted blocks of four cases stratified by treatment centre, sex and drinking goal (abstinence, controlled drinking, unspecific goal). At the time of recruitment, counsellors were blind to participants' group. Counsellors and clients were informed of their group allocation after study registration via text message. Research assistants that conducted follow-up telephone interviews were not blind to group allocation when assessing participant outcomes. The study protocol was approved by the Local Ethics Committee of the Canton of Zurich, Switzerland (KEK-StV-Nr. 25/10; date of approval: November 15, 2010).

### Participants

Study participants were recruited in three Swiss outpatient alcohol treatment centres in the cities of Zurich (Zürcher Fachstelle für Alkoholprobleme), Bern (Stiftung Berner Gesundheit) and Winterthur (Integrierte Suchthilfe Winterthur). A total of 46 counsellors from three treatment centres were informed about the study and were asked to recruit clients for study participation. To be eligible for participation, participants were required to meet the following inclusion criteria: (a) alcohol use was the main reason for treatment, (b) outpatient alcohol treatment was completed or would be completed within the week following recruitment, (c) participants must own and regularly use a mobile phone, (d) participants must be capable of text messaging and (e) participants must not have serious cognitive impairments or language difficulties.

### Procedure

Eligible clients were informed about the study by their counsellor in the last or second to last treatment session. Written informed consent was obtained from each study participant. Participants were registered by the counsellor for study participation online with their name, sex, mobile phone number, name of the counsellor, end of treatment date and drinking goal. The individual drinking goal was defined mutually by the participant and counsellor at the end of outpatient treatment. The individual drinking goal could be (a) abstinence, (b) controlled drinking or (c) unspecified (i.e. reduced consumption and awareness in the use of alcohol). For 'controlled drinking', the

individual drinking goal had to be clearly defined (e.g. 'no more than five standard drinks per week').

Follow-up telephone interviews were conducted 6 months after study registration (i.e. directly after the end of the SMS aftercare programme for patients of the intervention group). The telephone interviews were conducted by research assistants trained by the Swiss Research Institute for Public Health and Addiction.

### Intervention

With regard to theory, the intervention was primarily based on behavioural self-control techniques (e.g. 'goal setting' and 'self-monitoring') as well as social support. Social support in particular has previously been shown to be effective in the treatment of alcohol use disorders (Beattie and Longabaugh, 1999; Walters, 2000).

With regard to technology, the intervention programme was based on a computer expert system that automatically generated text output based on participants' individual characteristics entered into the system at the time of registration (e.g. name, sex, drinking goal) or throughout the monitoring process (e.g. adherence to drinking goal). The hardware components of the interactive system included a personal computer with an Internet connection. This computer contained the expert system and a Global System for Mobile Communications (GSM) modem. Text messages were sent via the modem from the PC to the patients' mobile phones. E-mails to notify the counsellors were sent from the expert system to the counsellors e-mail accounts. Figure 1 displays the technology used for the intervention programme.

The intervention included (a) monitoring of self-selected drinking goals at regular intervals, (b) motivational text messages to stick to the self-selected drinking goal and (c) proactive telephone calls from the counsellor for participants that were either not sticking to their drinking goal or in need of support.

For a period of 6 months, a computer expert system automatically generated individually tailored text messages for the weekly (Weeks 1–8) or bi-weekly (Weeks 10–26) monitoring of self-selected drinking goals. For example:

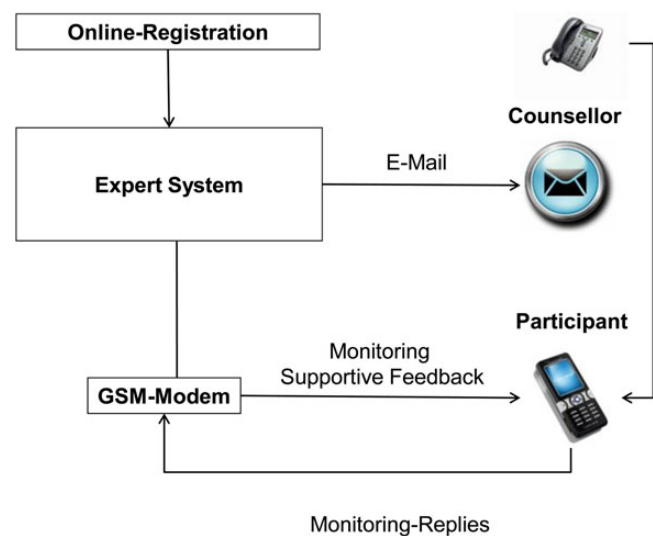


Fig. 1. Technology used for the intervention programme.

Dear Mrs Carl,

Your drinking goal is abstinence from alcohol.

Did you stick to this goal within the last 14 days?

Yes (Y)

Yes, but I need support (S)

No (N)

Please reply Y, S or N

Your team from the ZFA

The participant could respond to this monitoring question easily by typing a single letter, and then using the reply function on the mobile phone. The monitoring text messages were sent Mondays at 6 pm. If a participant replied 'Y' (i.e. they adhered to his or her drinking goal), a motivational feedback message was immediately sent to support the participant in maintaining their goal (e.g. 'Very good! In the case of stress—think of your strengths'). Participants could receive any one of 20 different supportive text messages that had previously been prepared by counsellors at the cooperating alcohol treatment centres. Supportive text messages were randomly chosen by the expert system and then sent to the participant.

If participants answered 'N' or 'S' (i.e. he or she could not stick to the drinking goal or needed support), they did not receive a text message feedback but a call-for-help e-mail was automatically sent to the responsible counsellor. A call-for-help e-mail was also sent if a participant did not respond to the monitoring text message within 2 days. These e-mails requested the counsellor to contact the participant via telephone. Reply text messages (i.e. 'Y', 'N' and 'S') sent within 48 h after the text message monitoring prompt were classified as 'expected' and triggered a motivational feedback message or call-for-help e-mail. Other replies were categorized as 'unexpected'. Unexpected text messages were also transmitted via e-mail to the counsellor. Counsellors personally evaluated these messages to determine whether they indicated a need for intervention.

Table 1 displays an example text message and e-mail dialogue for the 'controlled drinking' drinking goal.

Counsellors' phone calls were intended to be supportive, empathic, helpful and pragmatic, without intrusive questioning or blaming participants for a potential relapse. No specific therapeutic approach or training was used. Participants were informed beforehand that telephone calls would be brief.

Participants in the control group did not participate in the intervention described above.

### Measures and instruments

Data which are routinely assessed by the Information Network on Addiction Care and Therapy in Switzerland (act-info) were used to describe participants upon their admission to outpatient treatment with respect to their sex, age, partner relationship, educational degree, means of subsistence, treatment subsequent to prior alcohol detoxification and alcohol consumption. The latter was assessed using the three consumption items of the Alcohol Use Disorders Identification Test (Babor *et al.*, 1989), the AUDIT-C (Bush *et al.*, 1998).

Table 1. Example text message and e-mail dialogue for participants with the 'controlled drinking' drinking goal

#### Weekly SMS monitoring:

Dear Mr Adams,

Your drinking goal is to drink less than 6 units of alcohol per week. Did you stick to this goal within the last 7 days?

Yes (Y)

Yes, but I need support (S)

No (N)

Please reply Y, S or N

Your team from the ZFA

*Participant reply: 'Y' → Supportive feedback text message*

Well done! In the case of craving—try calling your friend.

*Participant reply: 'N' or 'S' → E-mail to therapist*

Dear Dr Peters,

Please call Mr Adams. He did not stick to his drinking goal or needs support.

His phone number is 02323 4343.

*No participant reply within 48 h → E-mail to therapist*

Dear Dr Peters,

Mr Adams did not respond to the SMS monitoring. Please give him a call. His phone number is 02323 4343.

All activity by the expert system was logged in an electronic file. Phone calls and attempts were documented by the counsellors on a brief standardized electronic protocol, which was sent with each call-for-help e-mail. The protocol included five yes/no questions addressing whether (a) the participant was called, (b) the participant needed support, (c) a brief consultation (maximum of 5 min) was conducted, (d) an extended consultation (>5 min) was conducted and (e) whether additional steps were arranged (e.g. deregistration from the text message programme, referral to outpatient or inpatient treatment). If additional steps were arranged, the counsellors were asked to describe in keywords which steps were arranged.

At the 6-month follow-up, we assessed alcohol consumption using the Short Form of the Alcohol Use Disorders Identification Test (AUDIT-C (Bush *et al.*, 1998)). A cut-off point of  $\geq 4$  (Dawson *et al.*, 2012) was used to assess at risk alcohol use. Furthermore, we used one item to assess the number of days participants had gone without drinking alcohol in the last 30 days. Utilization of treatment since discharge from outpatient alcohol treatment was assessed by providing a list with the following treatment options: (a) outpatient addiction treatment, (b) inpatient addiction treatment, (c) psychotherapeutic/psychiatric treatment, (d) self-help group, (e) Antabus, (f) Campral, (g) substitution treatment (e.g. Methadone, Buprenorphine), (h) emergency medical assistance.

Participants in the intervention group participated in a follow-up interview assessing whether (a) they regularly received the text message monitoring questions, and if not, why not, (b) they regularly responded to the monitoring questions, and if not, why not, (c) they answered the monitoring questions honestly, (d) the supportive text message feedbacks were helpful, (e) they would participate in the programme again, (f) the programme was helpful in aiding them to stick to their personal drinking goal, and whether (g) the possibility to receive support from the counsellor (if required) was helpful.

### Statistical analysis

Descriptive statistics were used to examine the results of the present research on intervention acceptance and evaluation. To test for baseline equivalence of intervention and control individuals,  $\chi^2$ -tests for categorical variables and *t*-tests for continuous



variables were used. Regression models were used to test the initial efficacy of the intervention on outcome measures. Logistic regression models were applied for the binary outcome variables (e.g. at-risk alcohol use and utilization of alcohol treatment); a linear regression model was used to assess differences between control and intervention groups on the item pertaining to abstinence from alcohol consumption (i.e. 'number of days without drinking alcohol within the last 30 days'). For the outcome 'at-risk alcohol use', we conducted both complete case analyses that included all participants with complete follow-up data and intention to treat (ITT) analyses that made the assumption that participants with missing data at the follow-up assessment were engaging in at-risk alcohol use. All data were analysed using SPSS, version 22. We performed two-tailed statistical tests with significance levels at  $P < 0.05$ .

## RESULTS

### *Study participants*

Twelve (25.5%) of 47 counsellors, who were informed about the study, recruited one or more study participants. There were substantial differences between the treatment centres in the proportion of counsellors, who recruited at least one participant with 11.4% in centre 1, ( $n = 4/35$  counsellors), 54.5% in centre 2 ( $n = 6/10$ ) and 100% in centre 3 ( $n = 2/2$ ).

No systematic data from the counsellors were available on reasons for not recruiting any study participants. Due to limited resources and low rates of counsellor willingness to collect additional data, eligibility criteria were not systematically assessed by all treatment centres and counsellors.

Based on data received from six counsellors from one of the three participating treatment centres (centre 2), 88 clients that completed outpatient alcohol treatment and did not have serious cognitive impairment or language difficulties were assessed to determine whether they owned a mobile phone and used text messaging. Only 1 (1.1%) of the 88 clients did not own a mobile phone and thus was not invited to participate in the current study. Out of the 87 clients eligible for participation, 40 individuals agreed to participate (46.0%). We did not systematically obtain information about reasons individuals chose not to participate, but according to the available data, the most common reasons were desire to end treatment, lack of interest, and stays or travels abroad after the end of treatment.

The flow of study participants is displayed in Fig. 2. Twenty-five participants (50.0%) were assigned to the text messaging aftercare intervention and 25 (50.0%) participants were assigned to the assessment only control group. No significant differences were observed for any of the variables assessed at admission to or discharge from outpatient treatment (Table 2).

In the SMS group, one participant discontinued the intervention 19 weeks after registration because support was no longer necessary from his perspective. A total of 45 (90.0%) of the 50 study participants were reached for the follow-up telephone interviews.

### *Intervention data*

No technical failures were experienced in the text message-based intervention system. The system sent out a total of 421 (24 participants  $\times$  17 monitoring dates, 1 participant  $\times$  13

monitoring dates) self-selected drinking goal monitoring text messages. Of these, participants provided a valid reply letter ('Y' or 'N') to 371 (88.1%) within 48 h. Of the 371 valid replies, 30 (8.1%) were call-for-help replies. Of the 25 intervention participants 11 (44.0%) sent at least one call-for-help reply. Figure 3 displays the number of participants with valid replies and call-for-help replies. Overall, there were 30 call-for-help replies and 50 monitoring prompts that were not replied to resulting in a total of 80 requests for counsellors to contact participants via telephone.

Based on the 46 available standardized electronic protocols of the counsellors, a total of 41 phone calls and 4 e-mails were used to contact participants. E-mails were used to contact participants only in the event where the participant was abroad and could not be contacted via phone. Only one phone call attempt to reach a participant proved unsuccessful and was documented by a counsellor. Of the 45 successful attempts, 34 (73.9%) resulted in brief consultations with a maximum of 5 min and 3 (6.7%) resulted in extended consultations. Of the remaining attempts, only four via phone and four via e-mail did not successfully result in consultation. The primary reason participants were not provided with a consultation was that participants replied to the monitoring with the wrong letter, which mistakenly resulted in a call-for-help. Based on the available protocols, additional steps, namely re-admission of outpatient treatment, were arranged for two participants.

### *Acceptability*

Out of the 21 intervention participants with follow-up interviews, 20 provided information regarding programme acceptance and evaluation. All 20 intervention participants indicated that they regularly received the text message monitoring questions. Nineteen of 20 (95.0%) participants affirmed that they regularly responded to the monitoring questions. The single participant that did not affirm regular responses to monitoring questions explained that he/she preferred to be called by the counsellor. Of 19 participants with valid answers, 14 (73.7%) affirmed that they answered the monitoring questions honestly. Of 19 participants with valid answers, 12 (63.2%) indicated that supportive text message feedback was helpful, 15 (75.0%) of 20 participants indicated that they would participate again in the programme, 9 (56.3%) of 16 participants indicated that the programme was helpful in adhering to their personal drinking goal, and 18 (94.7%) of 19 participants affirmed that the opportunity to receive support from the counsellor (when required) was helpful.

### *Initial exploration of efficacy*

Using complete case data, rates of at risk alcohol use (AUDIT-C  $\geq 4$ ) at the follow-up interview was 41.7% ( $n = 10/24$ ) in the control group and 28.6% ( $n = 6/21$ ) in the intervention group (OR = 0.56, 95% CI = 0.16–1.95,  $P = 0.36$ ). When analyses were conducted under the assumption that missing data were from at risk alcohol use participants, results were similar to analyses conducted using the complete data such that they were not significant (OR = 0.85, 95% CI = 0.28–2.61,  $P = 0.78$ ). Using complete data, the mean number of days participants went without drinking alcohol over the 30 days prior was 21.3 (SD = 10.7) in the control group and 23.5 (SD = 8.9) in the intervention group ( $P = 0.47$ ). Participants that utilized alcohol treatment following their discharge from outpatient treatment was

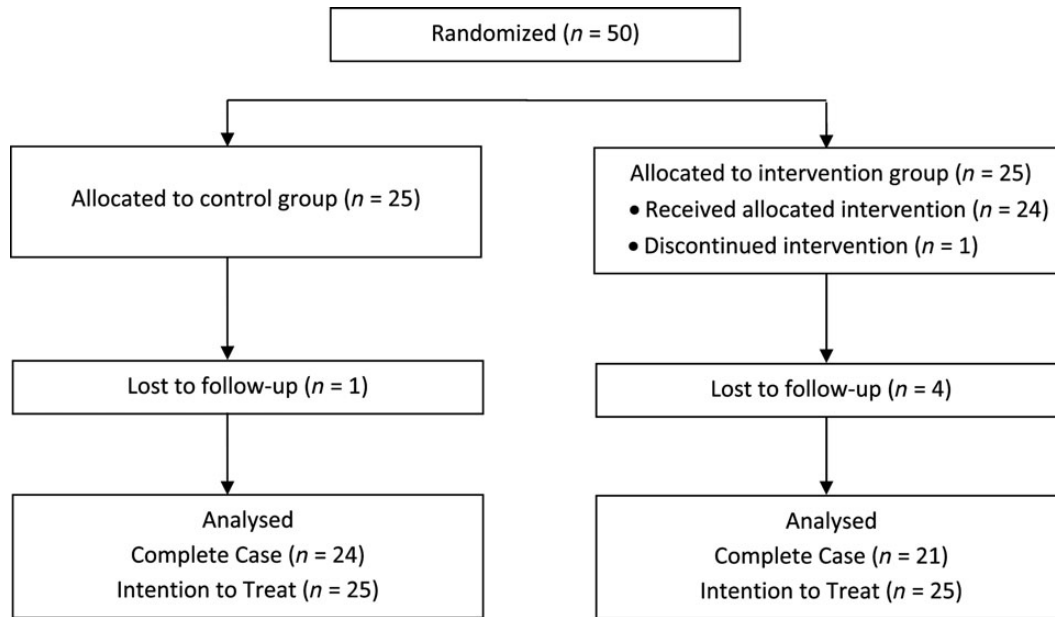


Fig. 2. Flow of study participants.

Table 2. Characteristics of study participants

	Control <i>n</i> = 25	Intervention <i>n</i> = 25	Total <i>n</i> = 50	<i>P</i>
Assessed at admission to outpatient treatment				
Female sex	7 (28.0%)	5 (20.0%)	12 (24.0%)	0.74
Educational degree <sup>a</sup>				0.55
Lower	2 (9.1%)	5 (20.0%)	7 (14.9%)	
Medium	10 (45.5%)	11 (44.0%)	21 (44.7%)	
Higher	10 (45.5%)	9 (36.0%)	19 (40.4%)	
Partner relationship <sup>b</sup>				0.78
Single/unstable relationship	10 (41.7%)	12 (48.0%)	22 (44.9%)	
Stable relationship	14 (58.3%)	13 (52.0%)	27 (55.1%)	
Means of subsistence				0.50
Own person	21 (84.0%)	18 (72.0%)	39 (78.0%)	
Other persons or institutions	4 (16.0%)	7 (28.0%)	11 (22.0%)	
Outpatient treatment subsequent to prior alcohol detoxification <sup>c</sup>				0.70
Yes	4 (16.7%)	3 (12.0%)	7 (14.3%)	
No	20 (83.3%)	22 (88.0%)	42 (85.7%)	
Alcohol use <sup>d</sup>				0.10
Not at risk (AUDIT-C < 4)	1 (4.0%)	5 (20.8%)	6 (12.2%)	
At risk (AUDIT-C ≥ 4)	24 (96.0%)	19 (79.2%)	43 (87.8%)	
Assessed at discharge from outpatient treatment/beginning of study				
Age <sup>e</sup> , <i>M</i> (SD)	50.4 (12.7)	43.8 (10.7)	47.1 (12.1)	0.05
Drinking goal				0.80
Abstinence	12 (48.0%)	13 (52.0%)	25 (50.0%)	
Controlled drinking	11 (44.0%)	9 (36.0%)	20 (40.0%)	
Unspecific	2 (8.0%)	3 (12.0%)	5 (10.0%)	
Number of days of outpatient treatment, <i>M</i> (SD)	631.4 (818.2)	551.0 (513.6)	591.2 (677.3)	0.18

Values are numbers (%) if not otherwise specified.

Notes: AUDIT-C = Consumption items of the Alcohol Use Disorders Identification Test. Missing values: <sup>a</sup>*n* = 3, <sup>b</sup>*n* = 1, <sup>c</sup>*n* = 1, <sup>d</sup>*n* = 1, <sup>e</sup>*n* = 1.

33% (*n* = 8/24) for the control and 42.9% (*n* = 9/21) for the intervention group (OR = 1.50, 95% CI = 0.45–5.03, *P* = 0.51).

## DISCUSSION

The aim of the present study was to investigate the feasibility, acceptability and initial effectiveness of a text message

aftercare approach among alcohol outpatients. The study revealed five main results, which will be discussed in the following sections: (a) the willingness of the counsellors to recruit participants for the text message aftercare programme was mixed, (b) based on the available data, nearly half of eligible clients (46%) participated in the study, (c) participants showed a high treatment compliance such that participants replied to 88% of the text monitoring messages, (d) the

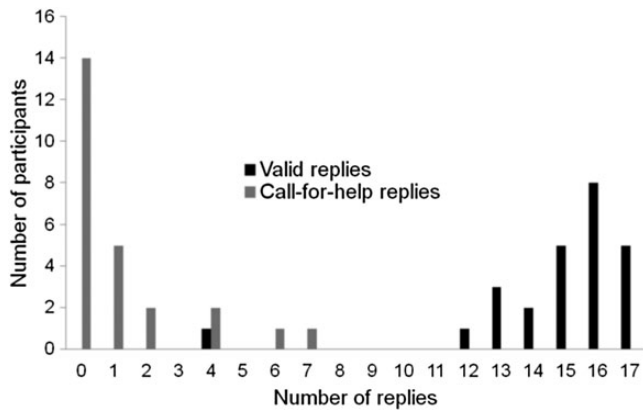


Fig. 3. Number of intervention participants with valid text message replies and call-for-help text message replies (total  $n = 25$ ).

programme was evaluated positively by the majority of the participants and (e) based on the small samples used in the current investigation, no significant intervention effects were found.

Although the heads of all cooperating outpatient treatment centres were very interested in the project and their counsellors could recruit and contact study participants during their working time, the willingness of the counsellors to recruit study participants was mixed, with large differences between the treatment centres. Based on personal conversations with several counsellors who were informed about the study, the main reasons counsellors opted not to ask their clients to participate in the study were that (a) the counsellors or (b) their clients were not enough technology-savvy, and (c) the counsellors could not guarantee that the client would receive aftercare due to the nature of the study design, i.e. the presence of an assessment only control group. Based on these results and based on a Cochrane Review addressing strategies to improve recruitment to randomized controlled trials (Trewick *et al.*, 2010) the following measures might help to increase participation rates within similar future studies: (a) demonstrating the technological simplicity of the programme, e.g. by the use of a video providing information on the programme and the study sequence, (b) using a minimal intervention control group instead of an assessment only control group, so that the counsellors can be sure that each client will receive one or another type of aftercare treatment and (c) providing information on the potential benefits of the aftercare treatment with reference to the promising results of the present and similar studies (e.g. Gustafson *et al.*, 2014; Lucht *et al.*, 2014).

Based on the available data, approximately half of the eligible clients participated in the study and text message aftercare programme. This participation rate is similar to past work (Lucht *et al.*, 2014) indicating ~50% of alcohol-dependent inpatients were randomized to either text message aftercare or treatment as usual. Methods to increase recruitment of eligible clients within future studies could be very similar to those mentioned in the previous section, namely: demonstrating the technological simplicity of the programme, providing information on its potential benefits and ensuring that every participant will receive an aftercare treatment.

In contrast to Lucht *et al.* (2014), treatment compliance was higher in the present study such that 96% (vs. 57% in Lucht *et al.*) of the participants responded to at least 50% of the text

message prompts. This difference might be due to differences in the severity of impairment (inpatients after detoxification vs. outpatients) between the population of participants in each study, or possibly due to a stronger selection of technology-savvy clients by the counsellors within the present study. It would be interesting for future studies to assess technology readiness and acceptance (Walczuch *et al.*, 2007) from both the clients' and the counsellors' perspectives to determine the extent to which these factors impact programme participation and compliance.

Together, high treatment compliance and the positive evaluations of the aftercare programme indicate that the text message programme is a feasible method for longer-term support and aftercare among individuals with alcohol use disorders. In particular, the ability to receive support from counsellors (when required) was rated as helpful by all participants (except for one participant). One limitation of this study is that we did not assess data on the time period or number of phone calls needed to reach the intervention participants in case of a call-for-help e-mail; furthermore, we did not assess whether the consultation addressed immediate drinking cues, craving or more general topics. Further investigation on the phone consultations and their content might reveal whether the time period of 48 h used in this study for the call-for-help replies is appropriate or too long.

Every second client (56%) indicated that the programme was helpful in adhering to the personal drinking goal. This result might reflect that less than half of the clients received brief consultations by the counsellors. Additional programme features like an assessment of individual strategies how to cope with craving situations or how to reward oneself for sticking to the personal drinking goal at discharge from outpatient treatment in combination with repeated text message reminders on these strategies might additionally help the clients to adhere to their drinking goal and to improve programme efficacy. Furthermore, the programme was not designed to adapt to an individual's changing drinking goal over time. However, given the intervention period of 6 months including phone consultations and the frequent use of additional alcohol treatment (43% in the intervention group), which might result in changes of the individual drinking goal, this feature might be included in order to provide support that better reflects the current situation of the client.

With regard to programme efficacy, results indicate that the implementation of similar programmes may result in a decrease in at-risk alcohol use and an increase in treatment use. In spite of this trend, conclusive results concerning the efficacy of this low intensive aftercare approach could not be derived likely due to the pilot character of this study. Another limitation of the study is that the effect of the different intervention components cannot be disentangled. Future investigations might compare a study group receiving text messaging-based monitoring and automated motivational feedback only with a group receiving additional proactive counsellor support in order to disentangle the effect of this key intervention ingredient.

An interesting aspect for further exploration might be whether the aftercare treatment allows counsellors to 'triage' clients and to focus resources only on those who need it. To investigate this, a detailed protocol of all client-counsellor contacts for participants in both study groups would be required.

In conclusion, this study shows that the interactive text message-based aftercare programme shows potential and

should be tested within an adequately powered randomized controlled trial.

**Acknowledgements** — We would like to thank Dr Ahmet Turan Tagmat for the technical development of the aftercare programme. Furthermore, we would like to thank the participating alcohol treatment centres, particularly Barbara Willmann, Roberto Rizzo and the team from the Zürcher Fachstelle für Alkoholprobleme, the team from the Integrierte Suchthilfe Winterthur, and Daniel Maibach and his team from the Berner Gesundheit. Finally, we appreciate the work of Heidi Bolliger, who conducted the follow-up telephone interviews.

**Funding** — Funding for this study was provided by the Swiss Foundation for Alcohol Research (Grant No. 218).

**Conflict of interest statement.** None declared.

## REFERENCES

- Astudillo M, Notari L, Maffli E. (2013) *Ambulante Suchthilfe: Ergebnisse der KlientInnenbefragung 2012 [Outpatient Addiction Treatment: Results of the Client Survey 2012]*. Lausanne: Sucht Schweiz.
- Babor TF, de la Fuente JR, Saunders J *et al.* (1989) *AUDIT the Alcohol Use Disorders Identification Test: Guidelines for Use in Primary Health Care*. Genf: World Health Organization, Division of Mental Health.
- Bauer S, Okon E, Meermann R *et al.* (2012) Technology-enhanced maintenance of treatment gains in eating disorders: efficacy of an intervention delivered via text messaging. *J Consult Clin Psychol* **80**:700–6.
- Beattie MC, Longabaugh R. (1999) General and alcohol-specific social support following treatment. *Addict Behav* **24**:593–606.
- Bottlender M, Soyka M. (2005a) Efficacy of an intensive outpatient rehabilitation program in alcoholism: predictors of outcome 6 months after treatment. *Eur Addict Res* **11**:132–7.
- Bottlender M, Soyka M. (2005b) Outpatient alcoholism treatment: predictors of outcome after 3 years. *Drug Alcohol Depend* **80**:83–9.
- Bush K, Kivlahan DR, McDonell MB *et al.* (1998) The AUDIT alcohol consumption questions (AUDIT-C): an effective brief screening test for problem drinking. Ambulatory care quality improvement project (ACQUIP). Alcohol use disorders identification test. *Arch Intern Med* **158**:1789–95.
- Dawson DA, Smith SM, Saha TD *et al.* (2012) Comparative performance of the AUDIT-C in screening for DSM-IV and DSM-5 alcohol use disorders. *Drug Alcohol Depend* **126**:384–8.
- Ehrenreich H, Mangholz A, Schmitt M *et al.* (1997) OLITA: an alternative in the treatment of therapy-resistant chronic alcoholics. First evaluation of a new approach. *Eur Arch Psychiatry Clin Neurosci* **247**:51–4.
- Gustafson DH, McTavish FM, Chih MY *et al.* (2014) A smartphone application to support recovery from alcoholism: a randomized clinical trial. *JAMA Psychiatry* **71**:566–72.
- Head KJ, Noar SM, Iannarino NT *et al.* (2013) Efficacy of text messaging-based interventions for health promotion: a meta-analysis. *Soc Sci Med* **97**:41–8.
- Kiefer F, Jahn H, Tarnaske T *et al.* (2003) Comparing and combining naltrexone and acamprosate in relapse prevention of alcoholism: a double-blind, placebo-controlled study. *Arch Gen Psychiatry* **60**:92–9.
- Klingemann H, Rosenberg H. (2009) Acceptance and therapeutic practice of controlled drinking as an outcome goal by Swiss alcohol treatment programmes. *Eur Addict Res* **15**:121–7.
- Krampe H, Stawicki S, Wagner T *et al.* (2006) Follow-up of 180 alcoholic patients for up to 7 years after outpatient treatment: impact of alcohol deterrents on outcome. *Alcohol Clin Exp Res* **30**:86–95.
- Lucht MJ, Hoffman L, Haug S *et al.* (2014) A surveillance tool using mobile phone short message service to reduce alcohol consumption among alcohol-dependent patients. *Alcohol Clin Exp Res* **38**:1728–36.
- Mason M, Ola B, Zaharakis N *et al.* (2015) Text messaging interventions for adolescent and young adult substance use: a meta-analysis. *Prev Sci* **16**:181–8.
- McKay JR. (2005) Is there a case for extended interventions for alcohol and drug use disorders? *Addiction* **100**:1594–610.
- Mueller SE, Petitjean S, Boening J *et al.* (2007) The impact of self-help group attendance on relapse rates after alcohol detoxification in a controlled study. *Alcohol Alcohol* **42**:108–12.
- Treweek S, Mitchell E, Pitkethly M *et al.* (2010) Strategies to improve recruitment to randomised controlled trials. *Cochrane Database Syst Rev*: MR000013.
- Walczuch R, Lemmink J, Streukens S. (2007) The effect of service employees' technology readiness on technology acceptance. *Inform Manage* **44**:206–15.
- Walters GD. (2000) Behavioral self-control training for problem drinkers: a meta-analysis of randomized control studies. *Behav Ther* **31**:135–49.
- Whittaker R, McRobbie H, Bullen C *et al.* (2012) Mobile phone-based interventions for smoking cessation. *Cochrane Database Syst Rev* **11**:CD006611.